

Fig. 1

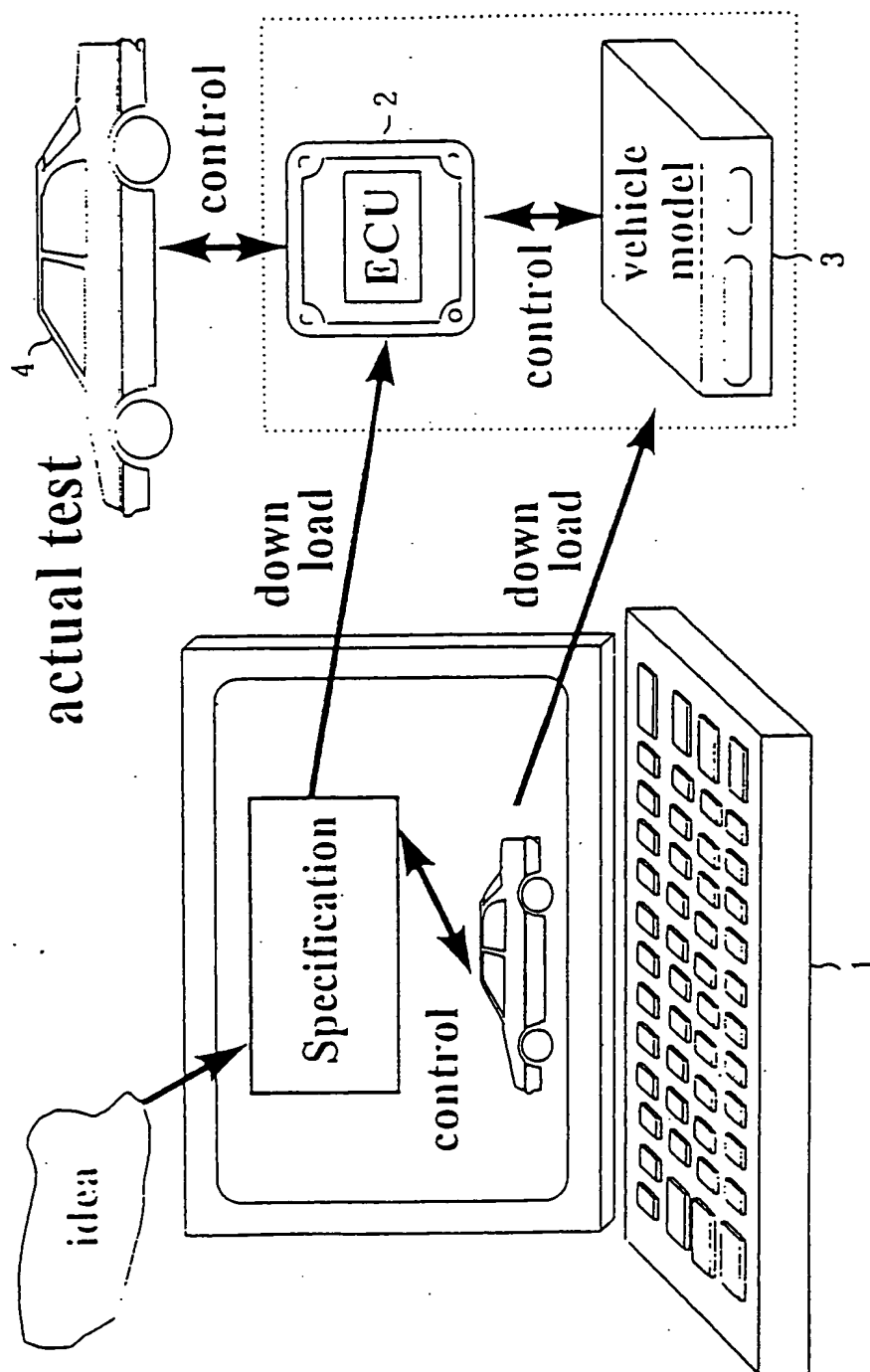


Fig. 2

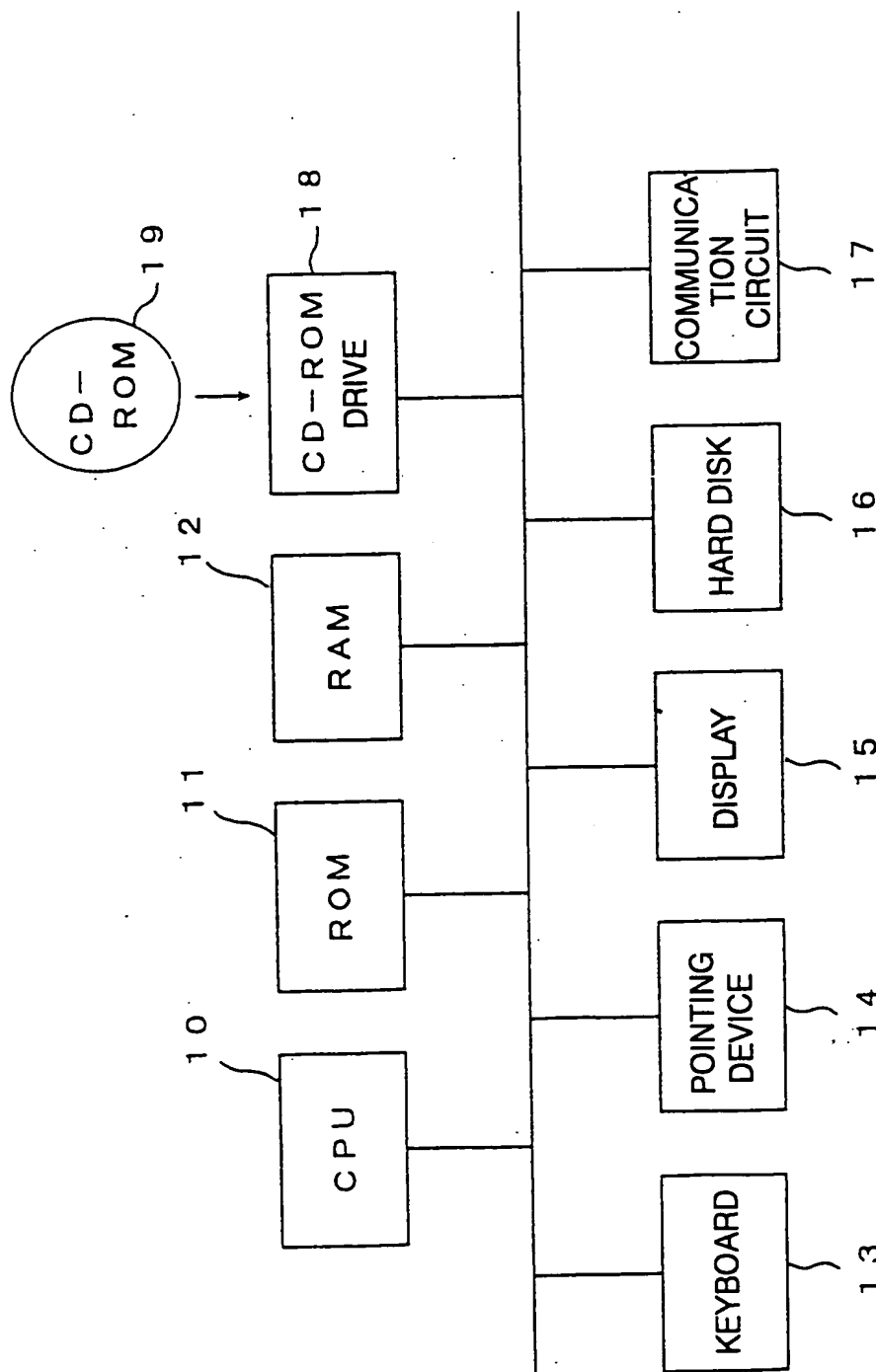
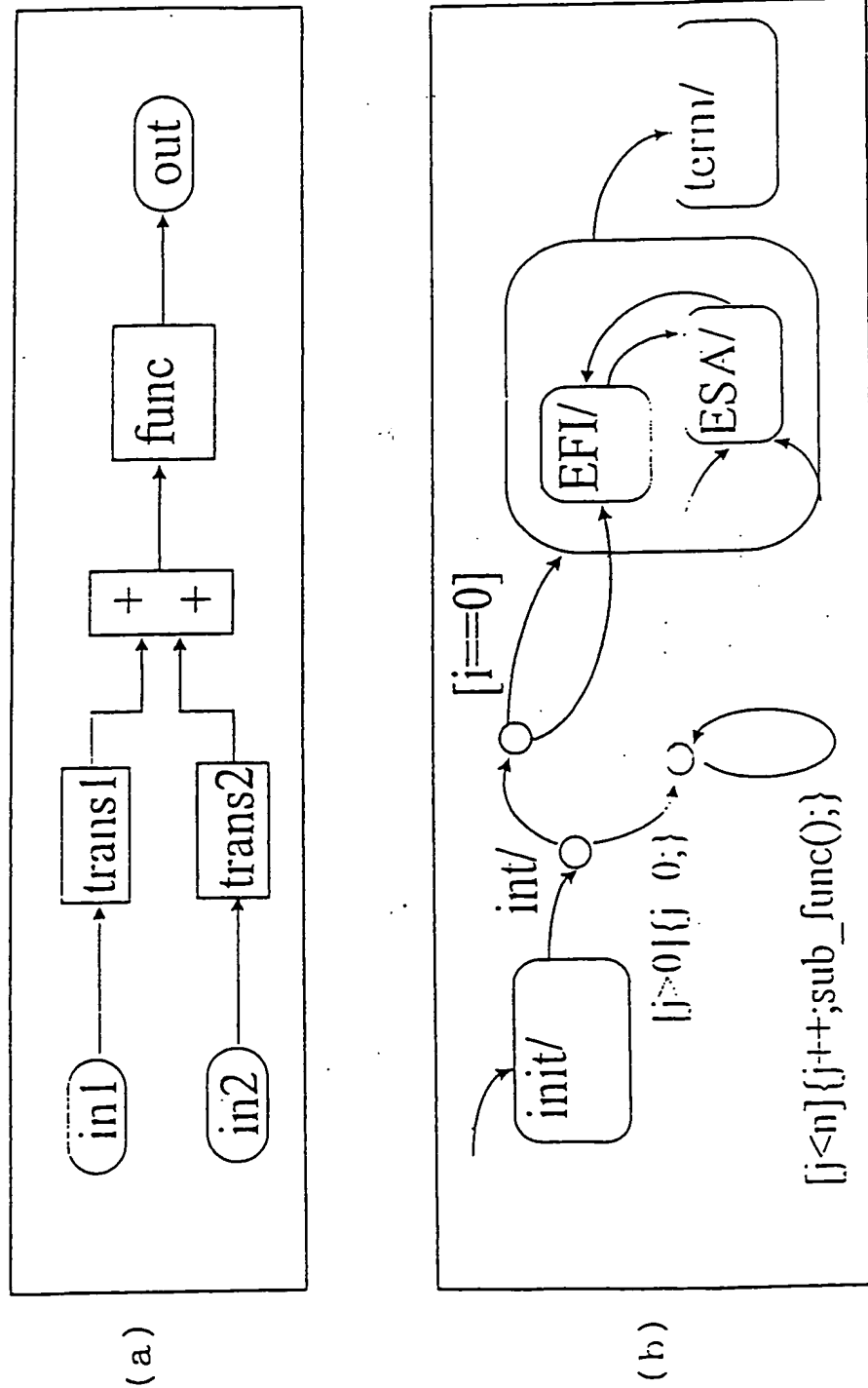
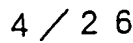


Fig. 3



[illegible]

**Fig. 5**

$$\begin{aligned} y(k) = & 0.7888 y(k-1) + \\ & 0.1784 y(k-2) - \\ & 0.1000 y(k-3) - \\ & 0.0010 u(k) + \\ & 0.0150 u(k-1) - \\ & 0.0040 u(k-2) - \\ & 0.0020 u(k-3) \end{aligned}$$

EXAMPLE OF AN EXPRESSION INCLUDING  
A FLOATING POINT NUMBER

Fig. 6

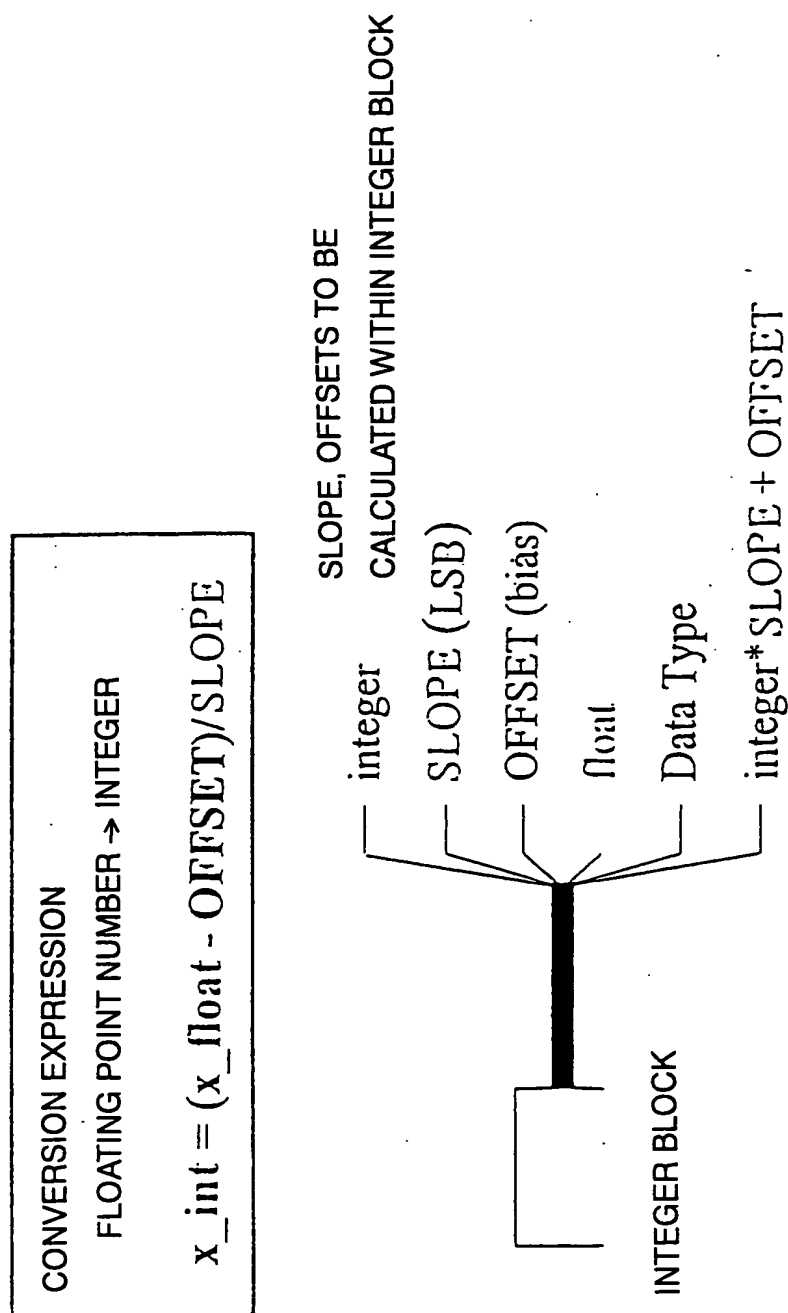


Fig. 7

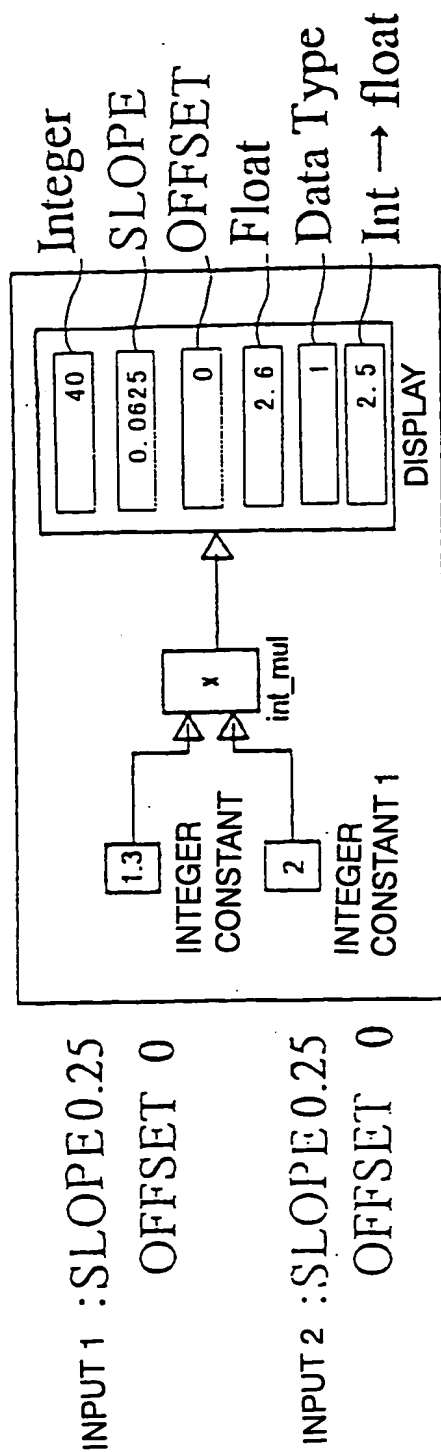


Fig. 8

( 1 )

MULTIPLICATION	
<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 10px;">INPUT 1</div> <div style="text-align: center; margin-right: 10px;"> <math display="block">\frac{(x - \text{offset1})}{\text{slope1}}</math> </div> <div style="text-align: center; margin-right: 10px;">×</div> <div style="text-align: center; margin-right: 10px;">INPUT 2</div> <div style="text-align: center;"> <math display="block">\frac{(y - \text{offset2})}{\text{slope2}}</math> </div> </div>	<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 10px;">=</div> <div style="text-align: center;"> <math display="block">\frac{xy - \text{offset1} * y - x * \text{offset2} + \text{offset1} * \text{offset2}}{\text{slope1} * \text{slope2}}</math> </div> </div>
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">             OUTPUT SLOPE : <math>\text{slope1} * \text{slope2}</math> </div> <div style="text-align: center;">             OUTPUT OFFSET : <math>\text{offset1} * y + x * \text{offset2} - \text{offset1} * \text{offset2}</math> </div> </div>	



Fig. 9

( 2 )

MULTIPLICATION	INPUT 1	INPUT 2	OUTPUT
	$\left( \frac{(x - \text{offset}_1)}{\text{slope}_1} + \frac{\text{offset}_1}{\text{slope}_1} \right) \times \left( \frac{(y - \text{offset}_2)}{\text{slope}_2} + \frac{\text{offset}_2}{\text{slope}_2} \right) =$	$\frac{Y_{\text{int}}}{Y_{\text{int}}}$	$\frac{xy}{\text{slope}_1 * \text{slope}_2}$

DESIGNATED SLOPE : slope\_o → OUTPUT

DESIGNATED OFFSET : offset\_o → OUTPUT

OFF1<sub>int</sub> : offset1/slope1, OFF2<sub>int</sub> : offset2/slope2

MULTIPLIED INTEGER VALUE :

$$((X_{\text{int}} + \text{OFF1}_{\text{int}}) * (Y_{\text{int}} + \text{OFF2}_{\text{int}}) * \text{slope}_1 * \text{slope}_2 - \text{offset}_o) / \text{slope}_o$$

Fig. 10

(1)

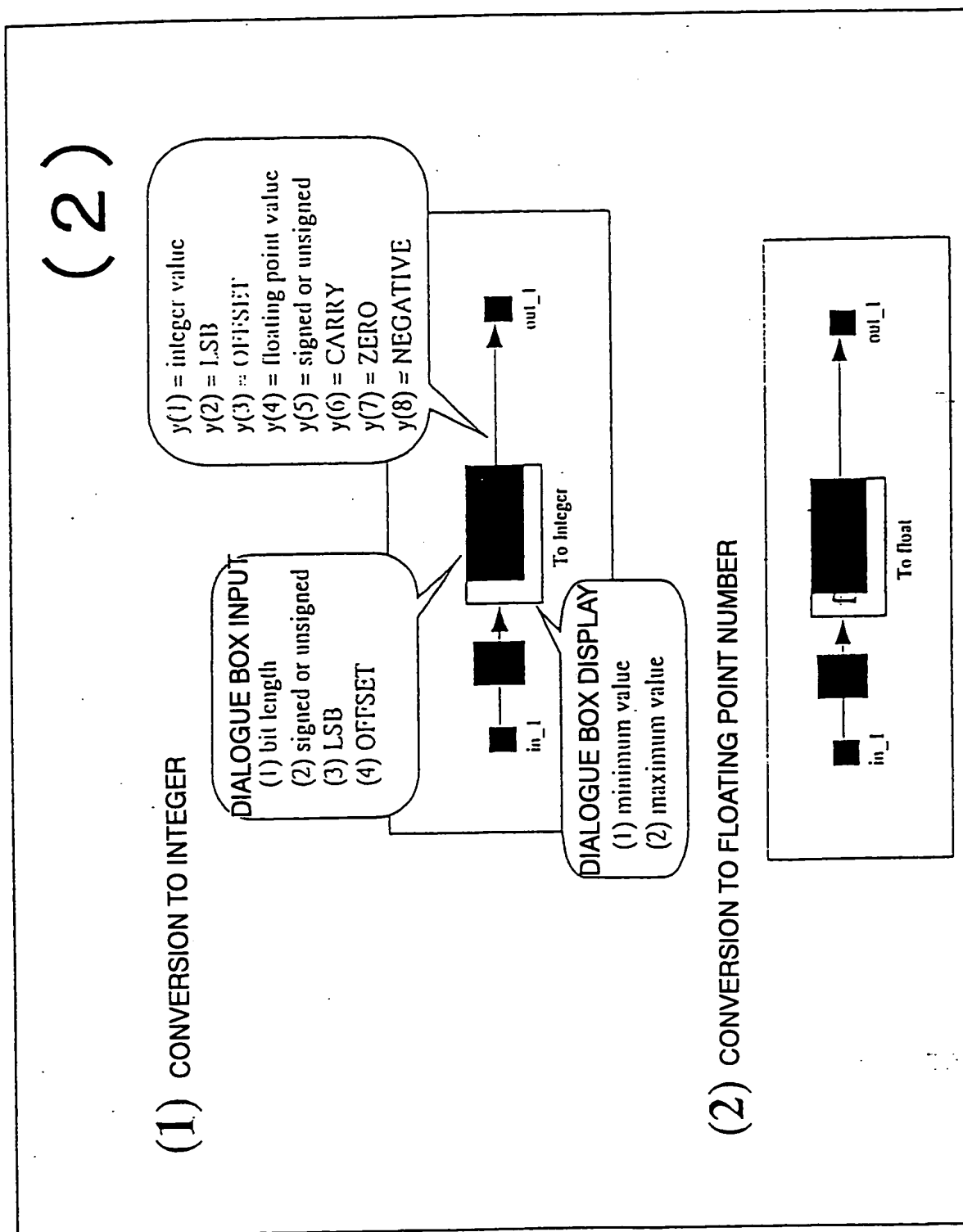
(1) ALL INTEGER LINES ARE VECTORS CONSTITUTING OF THE BELOW

$y(1)$  = integer value  
 $y(2)$  = LSB  
 $y(3)$  = OFFSET  
 $y(4)$  = floating point value  
 $y(5)$  = signed or unsigned  
 $y(6)$  = CARRY  
 $y(7)$  = ZERO  
 $y(8)$  = NEGATIVE

(2) INTEGER LOGIC SUPPORT TOOL HAS BLOCKS BELOW

(1) CONVERSION TO INTEGER	(9) 2D TABLE LOOK UP
(2) CONVERSION TO FLOATING	(10) SPLIT
(3) ADDITION POINT NUMBER	(11) UNIT DELAY
(4) MULTIPLICATION	(12) INTEGER SCOPE
(5) DIVISION	
(6) SURPLUS	
(7) SHIFT	
(8) 1D TABLE LOOK UP	

Fig. 11



(3)



Fig. 13

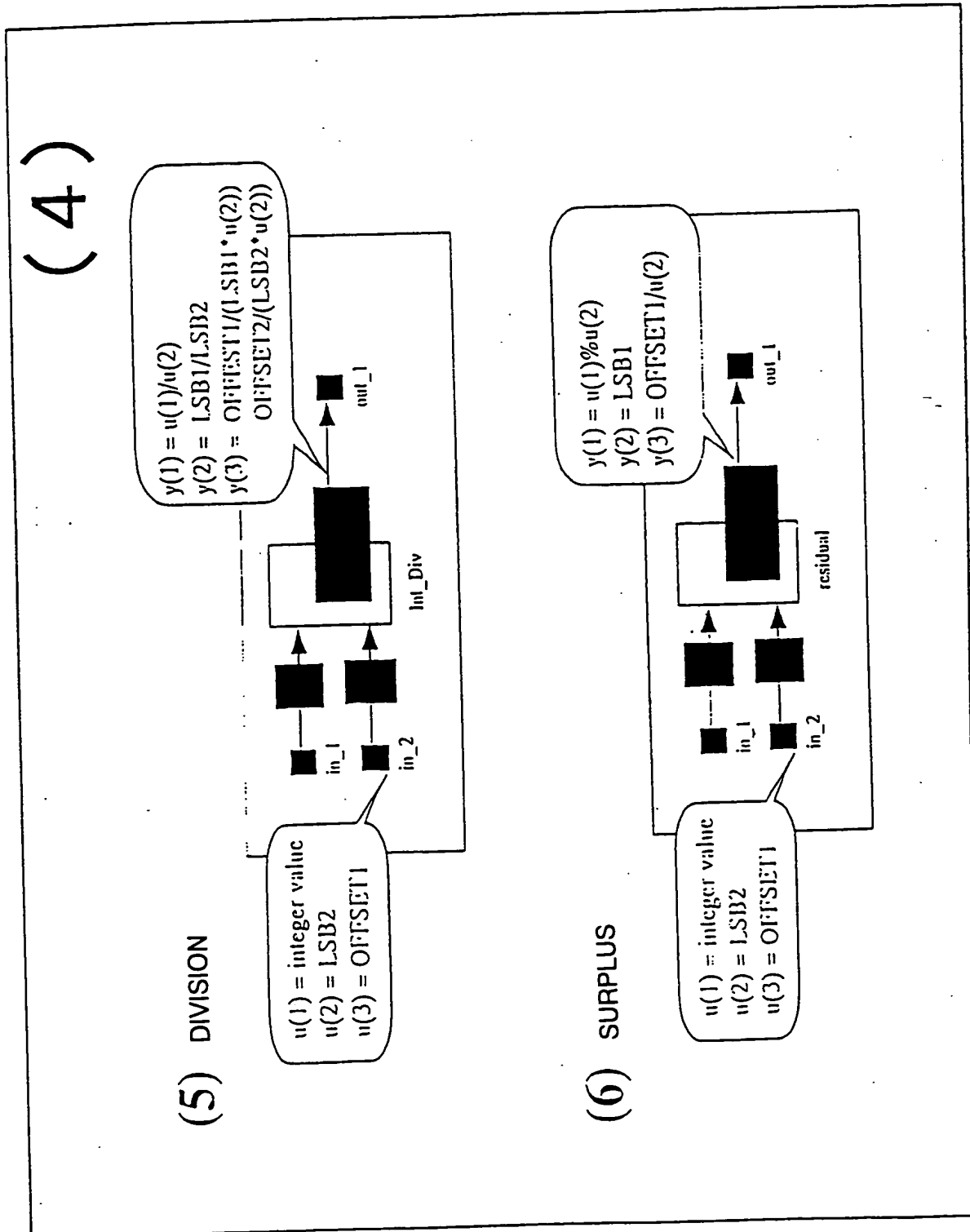


Fig. 14

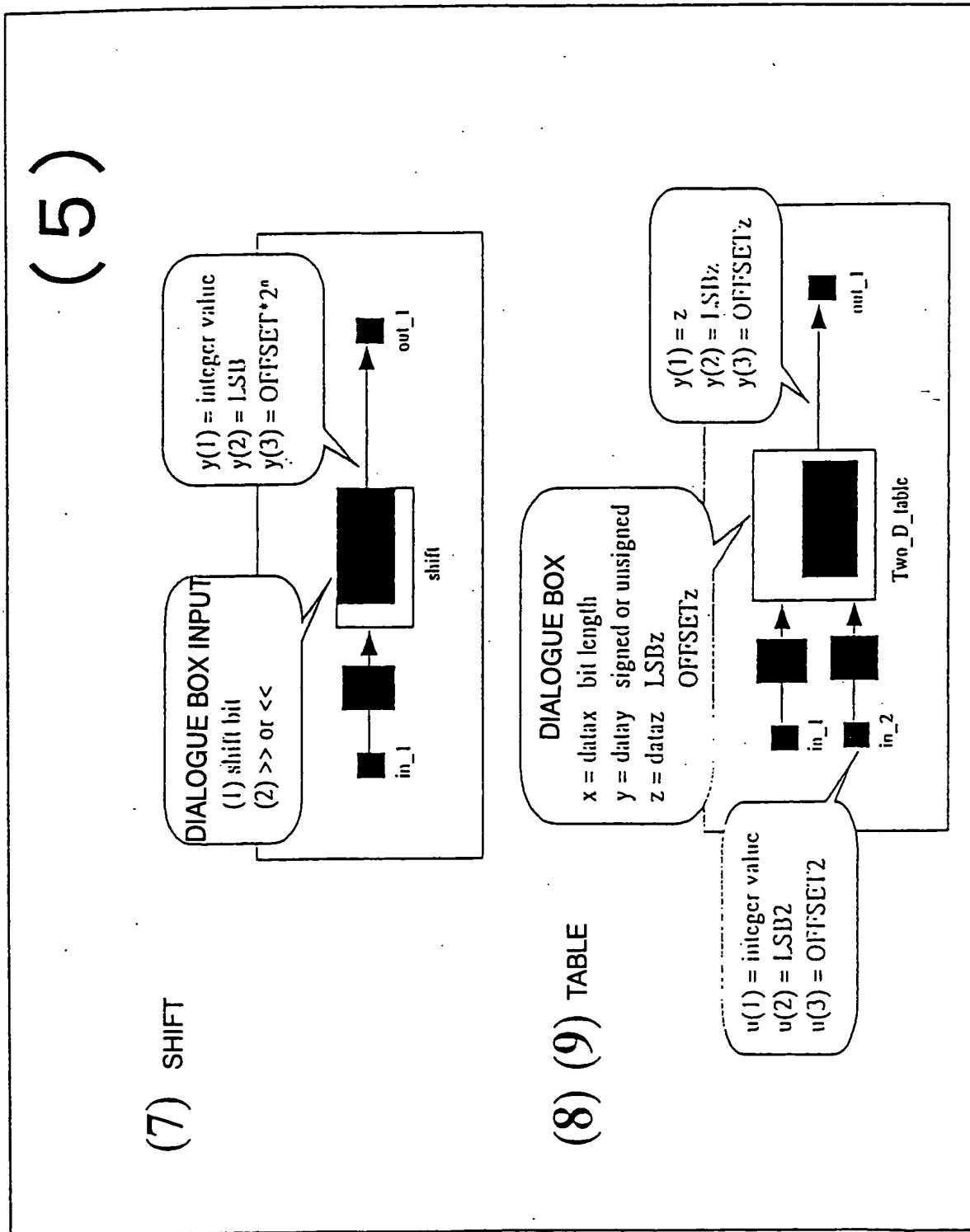


Fig. 15

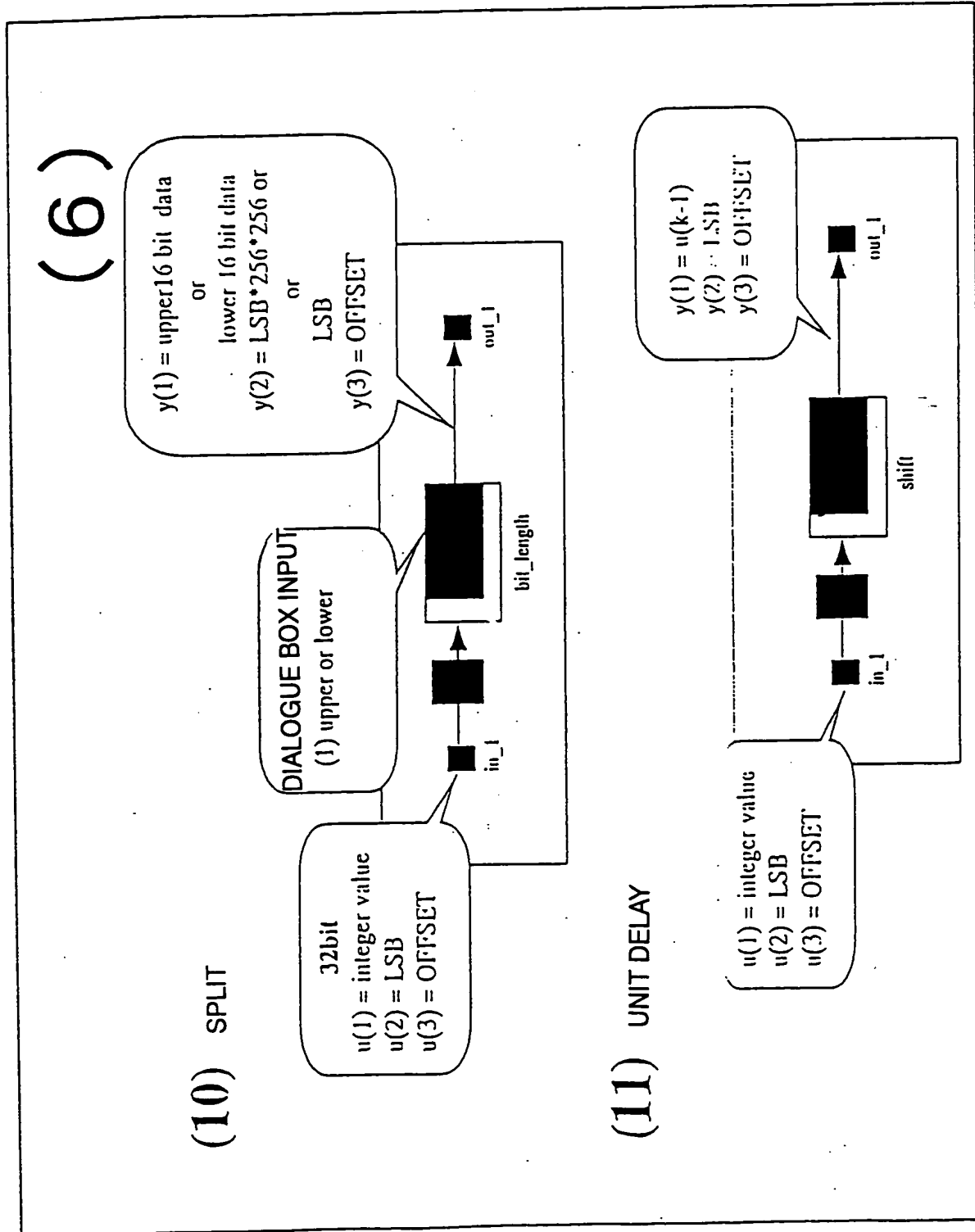


Fig. 16

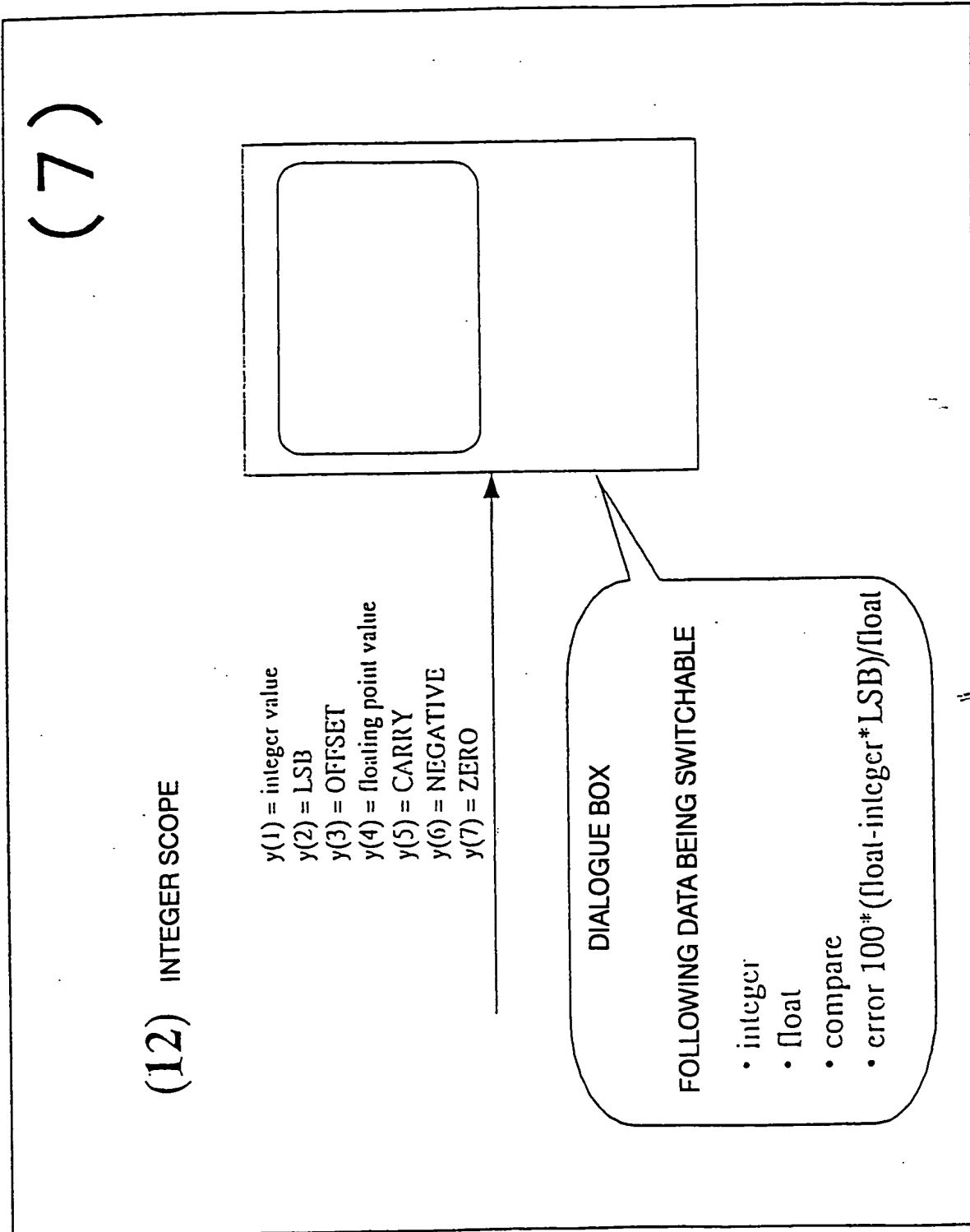




Fig. 17

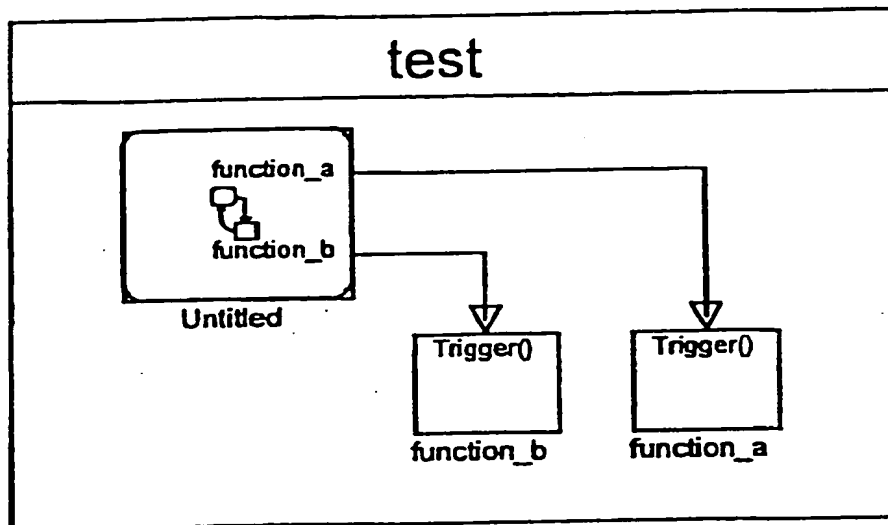
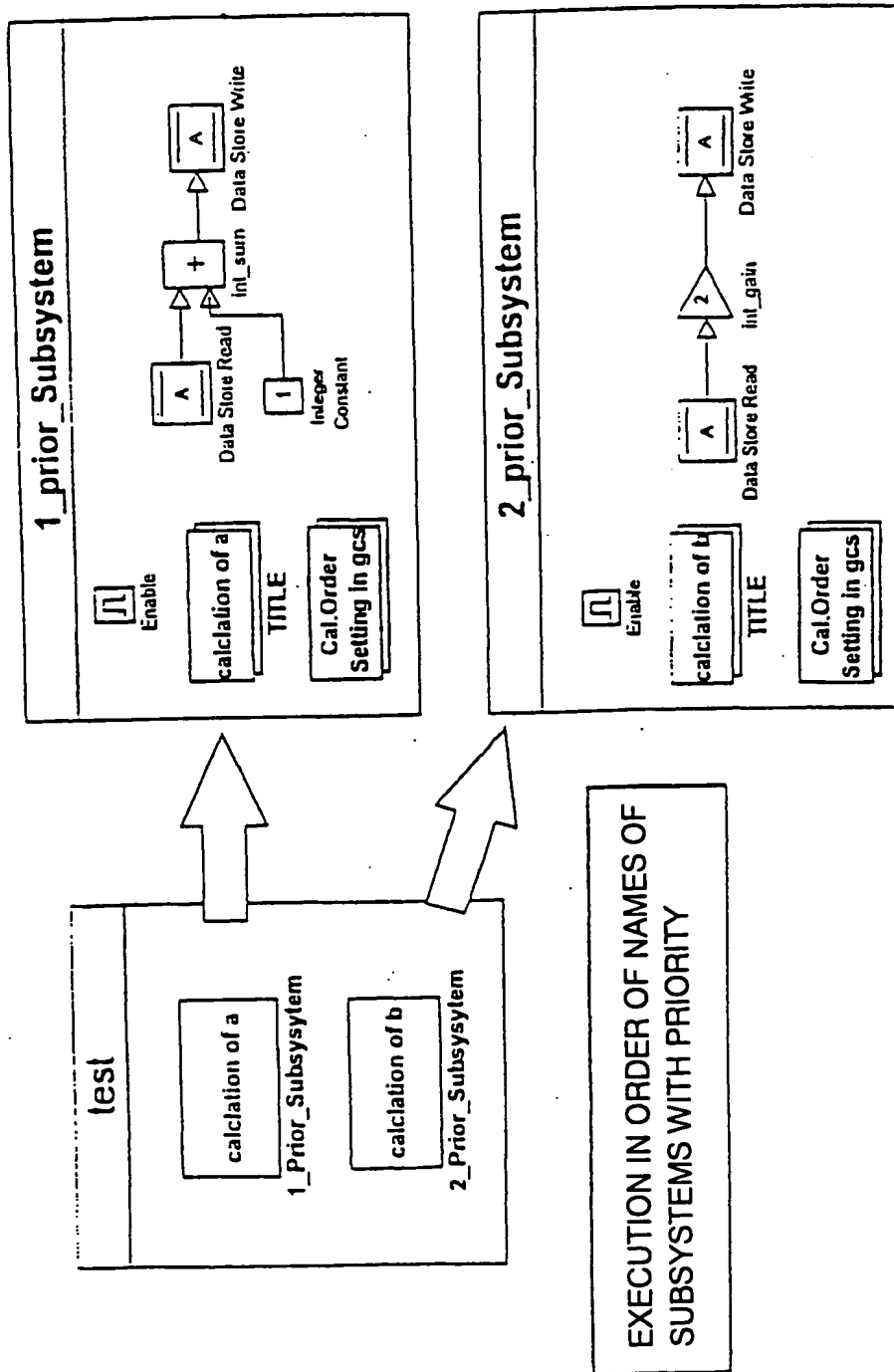


Fig. 18



EXECUTION IN ORDER OF NAMES OF  
SUBSYSTEMS WITH PRIORITY

Fig. 19

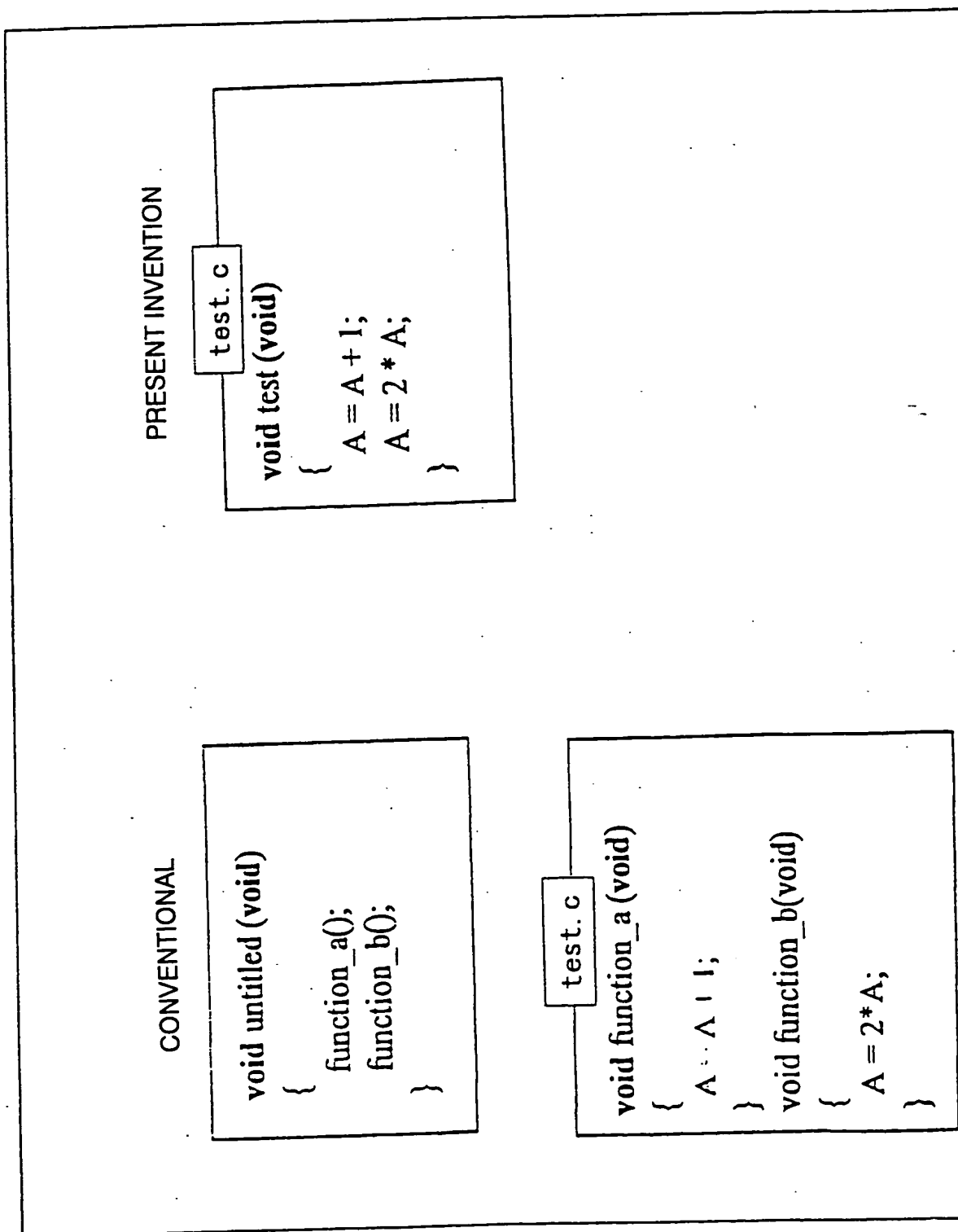
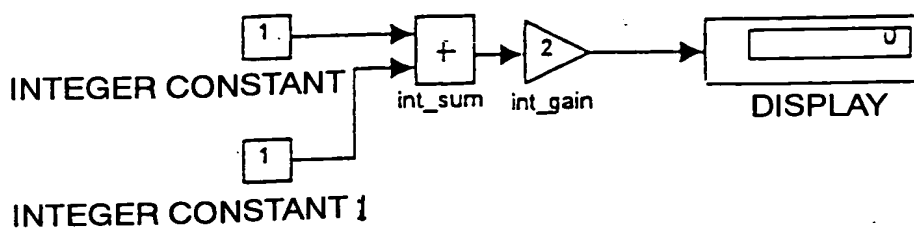


Fig. 20



```

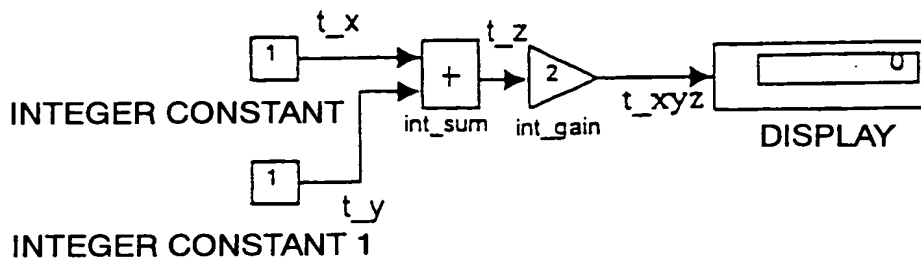
void untitled(void)
{
    s16 s1_S_Function;
    s16 s2_S_Function;
    s16 s4_S_Function;
    s16 s3_S_Function;

    /* int_sum : s4_S_Function */
    s4_S_Function = s1_S_Function+s2_S_Function;

    /* int_gain : s3_S_Function */
    s3_S_Function = (s16)(2*s4_S_Function);

    /* (no update to perform in root model) */
}
    
```

Fig. 21



```

void untitled(void)
{
    s16 t_x;
    s16 t_y;
    s16 t_z;
    s16 t_xyz;

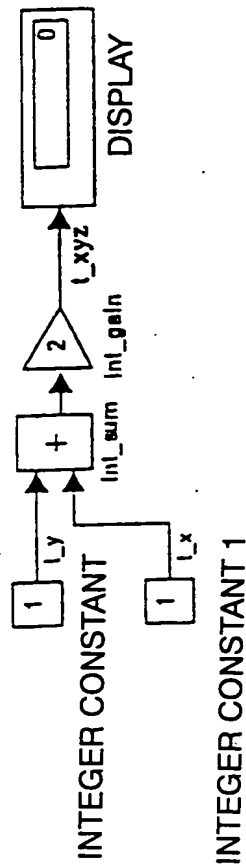
    /* int_sum : s4_S_Function */
    t_z = t_x + t_y;

    /* int_gain : s3_S_Function */
    t_xyz = (s16)(2 * t_z);

    /* (no update to perform in root model) */
}

```

Fig. 22



WITHOUT GROUPING

void untitled(void)

```
{
    sl6 t_x;
    sl6 t_y;
    sl6 s4_S_Function;
    sl6 t_xyz;

    s4_S_Function = t_x+t_y;
    t_xyz = (sl6)(2*s4_S_Function);
}
```

GROUPING

void untitled(void)

```
{
    sl6 t_x;
    sl6 t_y;
    sl6 t_xyz;

    /* int_gain : s3_S_Function */
    t_xyz = (sl6)(2*t_x+t_y);
}
```

**Fig. 23**

## GROUPING

(a)

ID	Signal Label
s1_S_Function	t_x

(b)

ID	EXPRESSION
s1_S_Function	x1*x2

Fig. 24

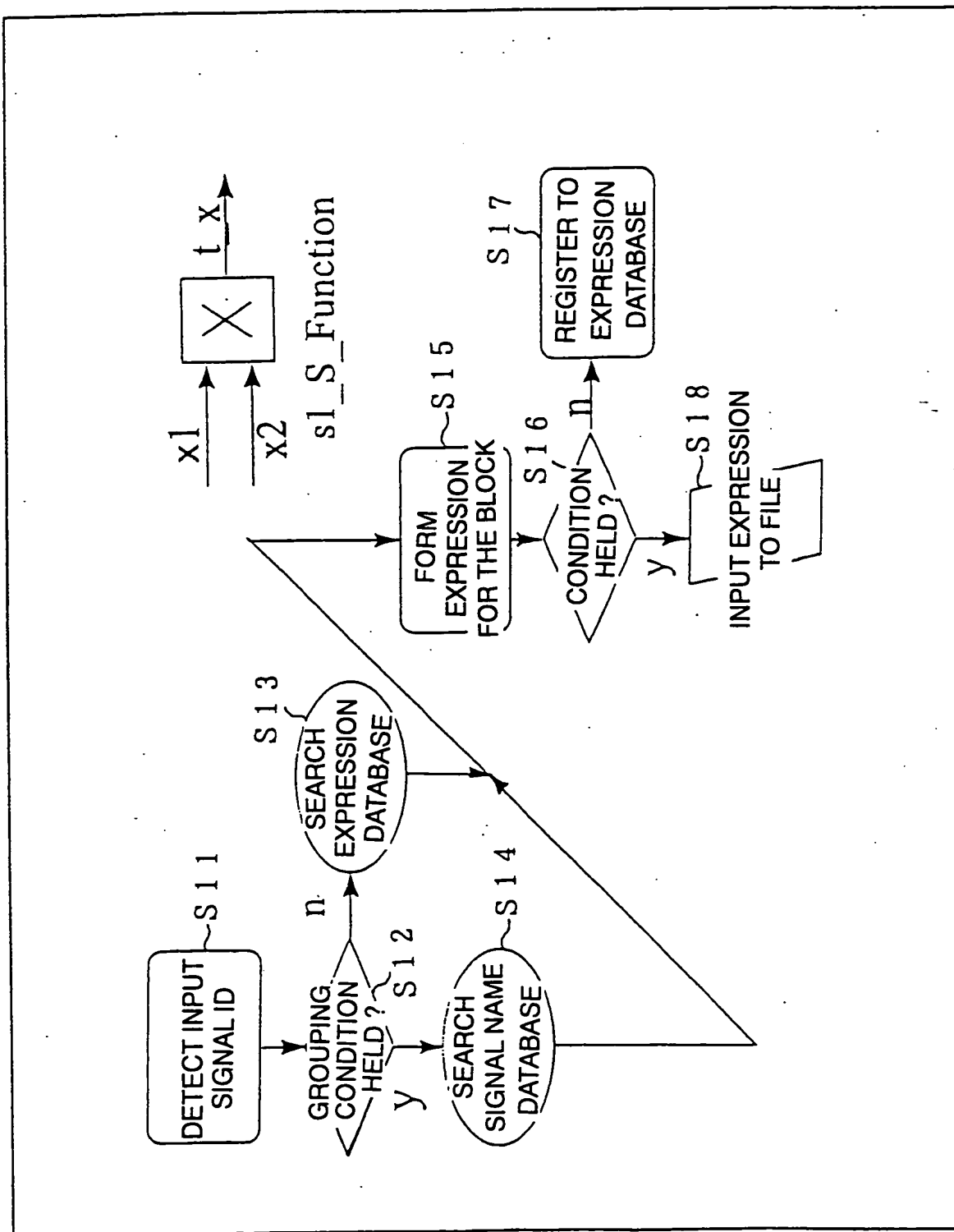
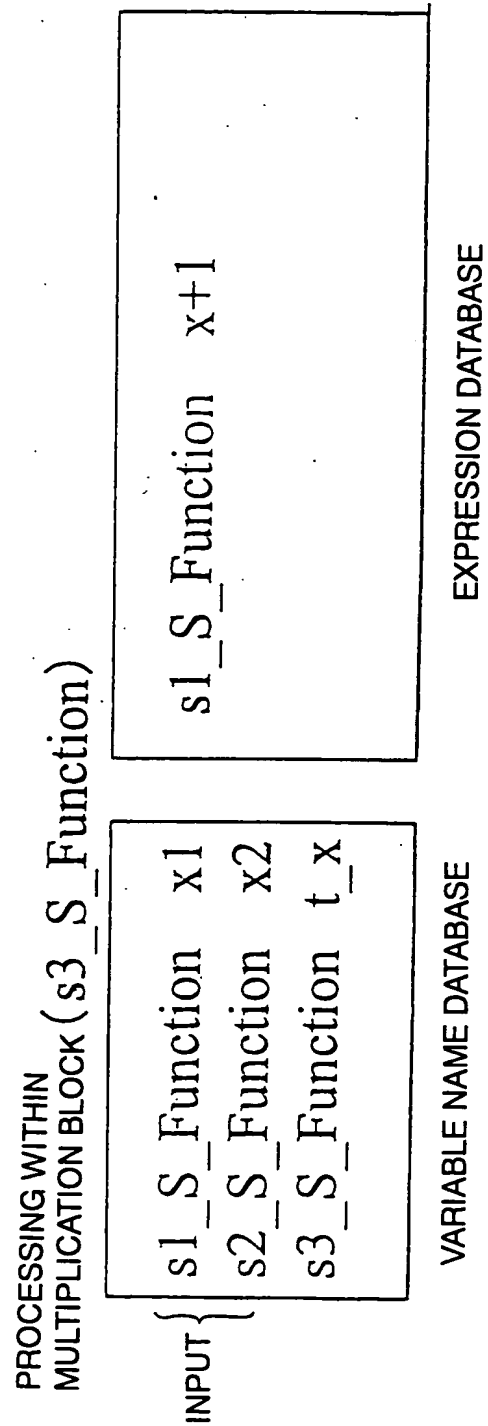




Fig. 25



Simulation

☐ stop

☐ pause

☒ run

PM state

NEswitch

☒ NE1

☐ Not Control

☐ NE2

ENGINE SPEED

Numerio Input

No. 2

0246810

STARTER

STA

☒ Manual

☐ time\_STA

STA

☒ Manual

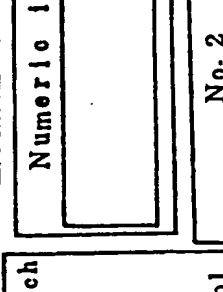
☐ time\_STA

NSW

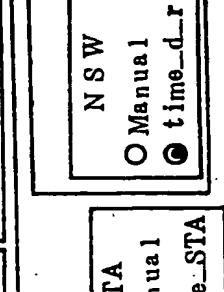
☐ Manual

☒ time\_d\_r

BRAKE



NE(rpm)



PM(mmHg)(INTAKE PRESSURE)